

Amendments to the Specification:

Please replace the paragraph beginning on page 10, line 6, with the following amended paragraph:

SUMMARY OF THE INVENTION

~~A method for ion planting a species into a surface layer of a workpiece in a chamber, the method includes placing the workpiece in a processing zone of the chamber bounded by a chamber side wall and a chamber ceiling facing said workpiece and between a pair of ports of the chamber near generally opposite sides to the processing zone and connected together by a conduit external of the chamber. The method further includes introducing into the chamber a process gas comprising the species to be implanted, and further generating from the process gas a plasma current and causing the plasma current to oscillate in a circulatory reentrant path comprising the conduit and the processing zone.~~

A plasma immersion ion implantation reactor for ion implanting a species into a surface layer of a workpiece includes an enclosure which has a side wall and a ceiling defining a chamber and a workpiece support pedestal within the chamber having a workpiece support surface facing the ceiling and defining a process region extending generally across the wafer support pedestal and confined laterally by the side wall and axially between the workpiece support pedestal and the ceiling. The enclosure has at least a first pair of openings at generally opposite sides of the process region and a first hollow conduit outside of the chamber having first and second ends connected to respective ones of the first pair of openings, so as to provide a first reentrant path extending through the conduit and across said process region. A gas distribution apparatus is provided on

or near an interior surface of the reactor for introducing a process gas containing the species to be ion implanted and a first RF plasma source power applicator for generating a plasma in the chamber.

Please replace the paragraph beginning on page 53, line 10 with the following amended paragraph:

The gas mixing layer 4484 may consist of metal or ceramic foam of the type well-known in the art. Or, as shown in FIG. 49, the gas mixture layer 4484 may consist of plural perforation plates 4484-1, 4484-2 each having many small gas orifices drilled through it, the holes in one perforation plate being offset from the holes in the other perforation plate. A bottom plate 4485 of the gas distribution plate 210 has many sub-millimeter gas injection holes 4486 (FIG. 50) drilled through it with large counterbored holes 4487 at the top of the bottom plate 4485. In one example, the sub-millimeter holes were between 10 and 30 mils in diameter, the counterbored holes were about 0.06 inch in diameter and the bottom plate 4485 had a thickness of about 0.4 inch. Inner and outer gas feed lines 4490, 4492 through the ceiling 110 furnish gas to the inner and outer top plates 4480a, 4480b, so that gas flow in radially inner and outer zones of the chamber may be controlled independently as a way of adjusting process uniformity.